

WHAT IS CLAIMED IS:

1. A torque distribution control device for a four-wheel drive vehicle having a torque transmission clutch for distributing the torque transmitted from an engine to prime drive wheels, to sub-drive wheels, said control device comprising pre-torque operation means for determining a pre-torque to be transmitted to said sub-drive wheels based on a vehicle speed, a throttle opening degree and the gear shift step of a transmission; compensation torque operation means for determining a compensation torque based on the rotational speed difference between said prime drive wheels and said sub-drive wheels; and command torque operation means for determining a command torque by the addition of said pre-torque and said compensation torque; wherein said torque transmission clutch is controlled based on said command torque input from said command torque operation means.

2. A torque distribution control device as set forth in Claim 1, wherein said compensation torque operation means determines said compensation torque based on said rotational speed difference between said prime drive wheels and said sub-drive wheels and said vehicle speed.

3. A torque distribution control device as set forth in Claim 1, wherein said pre-torque operation means is provided with plural pre-torque maps on each of which various pre-torques to be transmitted to said sub-drive wheels are set based on various vehicle speeds and various throttle opening degrees, respectively for the gear shift steps of said transmission, and wherein said pre-torque operation means determines said pre-torque by the selection of one of said plural pre-torque maps corresponding to a selected one of said gear shift steps.

4. A torque distribution control device as set forth in Claim 1, wherein said pre-torque operation means is provided with a pre-torque map on which various pre-torques to be transmitted to said sub-drive wheels are set based on various vehicle speeds and various throttle opening degrees, for at least one gear shift step of said transmission, and wherein said pre-torque operation means performs a modification

operation so that said pre-torque determined from said pre-torque map based on said vehicle speed and said throttle opening degree is modified in dependence on the difference between said one gear shift step and a selected gear shift step.

5. A torque distribution control device as set forth in Claim 1, wherein said pre-torque operation means determines said pre-torque to be transmitted to said sub-drive wheels based on said vehicle speed calculated from wheel speeds which are detected by wheel speed sensors, said throttle opening degree detected by a throttle sensor, and said gear shift step detected by a gear position sensor.

6. A torque distribution control device as set forth in Claim 1, wherein said torque distribution device is provided with an electromagnetic clutch for distributing said torque transmitted from said engine to said prime wheels, to said sub-drive wheels; and a current control circuit for applying to an electromagnetic coil of said electromagnetic clutch a command current which is necessary for said electromagnetic clutch to transmit said command torque to said sub-drive wheels.

7. A torque distribution control device for a four-wheel drive vehicle having a torque transmission clutch for distributing the torque transmitted from an engine to prime drive wheels, to sub-drive wheels, said control device comprising pre-torque operation means for determining a pre-torque to be transmitted to said sub-drive wheels based on a vehicle speed and a throttle opening degree; compensated pre-torque operation means for compensating said pre-torque based on said throttle opening degree and the acceleration/deceleration of said vehicle; feedback torque operation means for determining a feedback torque based on the rotational speed difference between said prime drive wheels and said sub-drive wheels; command torque operation means for calculating a command torque by the addition of said compensated pre-torque and said feedback torque; wherein said torque transmission clutch is controlled based on said command torque.

8. A torque distribution control device as set forth in Claim 7, wherein said feedback torque operation means determines said feedback torque based on said

rotational speed difference between said prime drive wheels and said sub-drive wheels and said vehicle speed.

9. A torque distribution control device as set forth in Claim 7, further comprising compensation torque operation means for determining a compensation torque based on said throttle opening degree and said acceleration/deceleration of said vehicle, wherein said compensated pre-torque operation means calculates said compensated pre-torque by adding said compensation torque to said pre-torque.

10. A torque distribution control device as set forth in Claim 7, wherein said compensated pre-torque operation means determines said compensated pre-torque by multiplying said pre-torque with a coefficient which is set in dependence on said throttle opening degree and said acceleration/deceleration of said vehicle.

11. A torque distribution control device as set forth in Claim 7, wherein said torque transmission clutch is constituted by an electromagnetic clutch, said control device further including electric current application means for applying a command electric current which is necessary for said electromagnetic clutch to transmit said command torque, to an electromagnetic coil of said electromagnetic clutch.